Roll No…….. **Total No. of Printed Pages: [01]**
Total No. of Questions: [09]

B. Tech. (ECE) (Semester – 5th)
INFORMATION THEORY & CODING
Subject Code: BECES1502
Paper ID: [18111321]

Time: 03 Hours **Maximum Marks: 60**

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A **(2 marks each)**

Q1. Attempt the following:

a) Define entropy.
b) Give the formula for mutual information.
c) What do you understand by codeword and prefix codes?
d) Why there is a need for error control coding?
e) Explain the term coding gain.
f) Draw lossless channel.
g) Enlist various types of codes.
h) Differentiate between cyclic codes and convolutional codes.
i) Give one distance property of convolutional codes.
j) Explain joint probability matrix.

Section – B **(5 marks each)**

Q2. State and prove source coding theorem.

Q3. Construct the Huffman code for following variables:
AAAABBAACCDDDEEEBADEF

Q4. Explain binary erasure and symmetric channels.

Q5. For a systematic [6, 3] linear block code, the parity matrix [P] = [1 0 1 0 1 1 1 1 0]. Find all the possible code vectors.

Q6. Draw and explain convolution encoder connection diagram.

Section – C **(10 marks each)**

Q7. Draw the state diagram, tree diagram and trellis diagram for the K=3, rate=1/3 code generated by g1(X) = X + X2; g2(X) = 1+ X + X2; g3(X) = 1+X

Q8. Derive the expression for matrix description of linear block codes.

Q9. Explain continuous channels and differential entropy.